

**~~DRAFT~~**  
**FINAL**  
**REMOVAL ACTION REPORT**

**FOR THE  
GULFCO MARINE MAINTENANCE  
SUPERFUND SITE  
FREEPORT, TEXAS**

**PREPARED BY:**

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## LIST OF ACRONYMS

ACM – Asbestos Containing Material  
AST – Aboveground Storage Tank  
BHHRA – Baseline Human Health Risk Assessment  
COD – Certificate of Destruction  
EEI – Effective Environmental, Inc.  
EPA – United States Environmental Protection Agency  
FSP – Field Sampling Plan  
GRG - Gulfco Restoration Group  
NPL – National Priorities List  
OVM – Organic Vapor Meter  
PCE - Tetrachlorethene  
PBW – Pastor, Behling & Wheeler, LLC  
ppmv – parts-per-million by volume  
RI/FS – Remedial Investigation/Feasibility Study  
SVOC – Semi-Volatile Organic Compound  
TCEQ – Texas Commission on Environmental Quality  
TCE - Trichloroethene  
VOC – Volatile Organic Compound

## REMOVAL ACTION CERTIFICATION

Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of the report, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

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## 1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) named the former site of Gulfco Marine Maintenance, Inc. (Gulfco) in Freeport, Brazoria County, Texas (the Site) to the National Priorities List (NPL) in May 2003. On October 26, 2010, the EPA filed and executed an Administrative Settlement Agreement and Order on Consent for Removal Action (Settlement Agreement) (EPA, October, 2010) addressing the former aboveground storage tank farm (AST Tank Farm) located in the southern portion of the Site. The Settlement Agreement required the removal of ASTs that contain hazardous substances from the barge cleaning operations, in accordance with the Removal Action Work Plan included as Appendix D of the Settlement Agreement (included as Appendix A to this report). Pastor, Behling & Wheeler, LLC (PBW), coordinated the Removal Action of behalf of the Settlement Agreement Respondents LDL Coastal Limited LP (LDL), Chromalloy American Corporation (Chromalloy), and The Dow Chemical Company (Dow), collectively known as the Gulfco Restoration Group (GRG), and Parker Drilling Company, which, while not a Respondent to the Settlement Agreement, recently reached an agreement to participate with the Respondents in the Removal Action. Figure 1 provides a map of the Site vicinity, while Figure 2 provides a Site map.

### 1.1 PURPOSE

Pursuant to Paragraph 42 of the Settlement Agreement, this Removal Action Final Report summarizes the actions taken to comply with the Settlement Agreement, in accordance with the Removal Action Work Plan (Appendix D of the Settlement Agreement A). Specifically this report documents removal and proper disposal of hazardous liquids and solids contained in the ASTs; removal, demolition and disposal of the tanks in the AST Tank Farm; and decontamination of the AST Tank Farm containment areas.

### 1.2 SITE BACKGROUND

The Site is located in Freeport, Texas at 906 Marlin Avenue (also referred to as County Road 756) (Figure 1). The Site consists of approximately 40 acres within the 100-year coastal floodplain along the north bank of the Intracoastal Waterway between Oyster Creek approximately one mile to the east and the Texas Highway 332 bridge approximately one mile to the west. Marlin Avenue divides the Site into two primary areas (Figure 2). For the purposes of

descriptions in this report, Marlin Avenue is approximated to run due west to east. The property to the north of Marlin Avenue (the North Area) contains some upland areas created from dredge spoil, but most of this area is considered wetlands. The North Area is not addressed by this report. The 20-acre upland property south of Marlin Avenue (the South Area) was created from dredged material from the Intracoastal Waterway and developed for industrial uses. It contains multiple structures, a dry dock, two barge slips connected to the Intracoastal Waterway, and the AST Tank Farm, which is the subject of this report.

The AST Tank Farm consisted of two adjacent concrete beamed areas, referred to hereafter as the North Containment and the South Containment Areas. Six ASTs were located in the North Containment Area (a seventh tank, Tank No. 100, which was empty, was removed from the Site in September 2008 by Hurricane Ike storm surge), and eight ASTs were located in the South Containment Area. The tank locations and designations are shown on Figure 3, and the tanks and their contents are summarized in Table 1. The tanks were used to store product heels and wash waters associated with barge cleaning operations.

The South Area is zoned as “W-3, Waterfront Heavy” by the City of Freeport. This designation provides for commercial and industrial land use, primarily port, harbor, or marine-related activities. Restrictive covenants prohibiting any land use other than commercial/industrial and prohibiting groundwater use have been filed for all parcels within both the North and South Areas.

Adjacent property to the north, west and east of the North Area is unused and undeveloped. Adjacent property to the east of the South Area is currently used for industrial purposes while the property directly to the west of the Site is currently vacant and previously served as a commercial marina. The Intracoastal Waterway bounds the Site to the south. Residential areas are located south of Marlin Avenue, approximately 300 feet west of the Site, and 1,000 feet east of the Site.

### **1.3 REPORT ORGANIZATION**

The Removal Action Final Report has been organized to include information specified by the Settlement Agreement. A summary of the Removal Action is provided below in Section 2. Sampling and analysis activities performed during the Removal Action are discussed in Section 3. Removal Action conclusions are provided in Section 4. References are listed in Section 5.



Supporting documentation for the Removal Action, including photographs, waste disposal manifests, tank Certificates of Destruction (COD), laboratory analytical reports and other related reports/information, is provided in the report appendices.

Pursuant to Settlement Agreement requirements, ~~this a Draft Removal Action Report is being~~ was submitted within 120 days of the Settlement Agreement Effective Date of October 29, 2010.

Also per Settlement Agreement requirements, this Final Removal Action Report is being submitted within 14 days of receipt of EPA's March 9, 2011 letter approving (with modifications) that draft report. All tank content removal, tank decontamination, tank demolition and

containment area decontamination field activities were completed within the 90 days of the Effective Date as also specified in the Settlement Agreement. However, due to a temporary suspension in operations at the incinerator used for disposal of hazardous solids generated during the Removal Action, nine roll-off boxes of hazardous solids could not be shipped from the Site to the disposal facility until after the 90-day deadline (January 27, 2011). A 30-day extension to this deadline was requested on January 26, 2011 and was granted by EPA on January 31, 2011.

Additional delays in obtaining disposal "slots" at the incinerator required a second extension request to March 25, 2011, which was granted by EPA on February 23, 2011. Due to these delayed waste shipment dates, not all of the Removal Action supporting documentation described above has yet been received from the Removal Action contractor ~~f~~, Effective Environmental, Inc. (EEI) ~~f~~. All such documentation that is not available for inclusion in this ~~draft report~~, Final

Removal Action Report will either be provided in the ~~Final Removal Action Report~~, or submitted as addendum to the ~~final report depending on when the documentation is received.~~

## 2.0 REMOVAL ACTION SUMMARY

The Settlement Agreement provided for completion of all field activities within 90 days from the effective date of October 29, 2010. EEI mobilized equipment and materials to the Site and began field activities on November 15, 2010. EEI demobilized all equipment from the Site (except for the roll-off boxes awaiting disposal slots as described previously) on January 27, 2011.

The Removal Action included characterization and management of water accumulated in the AST Tank Farm containment areas; removal and disposal of liquid wastes from the tanks; and solidification, removal and disposal of non-liquid (solids and sludge) wastes from the tanks. Following wastes removal and tank decontamination, the tanks were demolished. The North and South Containment Areas were decontaminated and the concrete containment beams were breached so that rainfall will freely drain from the structures. Piping, metal “cat-walks”, and a steel hopper-like structure located within the North Containment Area were demolished and removed. A metal walled structure located immediately to east of the North Containment Area was also demolished and removed. The Removal Action also included an asbestos survey, and the removal and disposal of debris located inside and east of the containment areas. The Removal Action is discussed below; photographs documenting the Removal Action are included in Appendix AB.

### 2.1 MANAGEMENT OF ACCUMULATED WATER

In April 2010, PBW collected samples of accumulated water from the North and South Containment areas. Based on analytical results from these samples, PBW on behalf of the GRG, submitted an Industrial Wastewater Permit Application Abbreviated Technical Report to the Texas Commission of Environmental Quality (TCEQ) requesting discharge of accumulated water from the containment areas. On July 27, 2010, the TCEQ issued a letter to Gary Miller of EPA establishing criteria and authorizing discharge of accumulated water from the containment areas into the Intracoastal Waterway (Appendix BC). Following confirmation that the pH of water in the containment areas met the discharge criteria and prior to commencing other Removal Action activities, approximately 15,000 gallons of water from the North Containment Area and approximately 13,500 gallons of water from the South Containment Area were discharged to the Intracoastal Waterway on November 15 and 16, 2010.

Following a rain event at the Site in late December 2010 during performance of the Removal Action, accumulated water from both the North and South Containment Areas was sampled a second time on December 30, 2010. The analytical results from the sample collected from the South Containment Area met discharge criteria (Table 2); and a total of approximately 17,000 gallons of accumulated water were discharged from the South Containment Area to the Intracoastal Waterway on January 5, 6, and 10, 2010. The analytical results for the North Containment Area water sample did not meet discharge criteria (Table 2); and a total of approximately 6,800 gallons of impacted water were pumped from the North Containment Area into tanker trailers and transferred off-site for disposal. One tanker containing approximately 1,800 gallons of this impacted water was transported from the Site to the Clean Harbors, Deer Park facility on January 6, 2011 (included with other Site aqueous wastes). A second tanker containing approximately 5,000 gallons of impacted water from the North Containment Area was transported to Clean Harbors on January 27, 2011. A summary of liquid wastes shipments from the Site during the Removal Action is provided in Table 3, and available waste manifests documenting the transport of the aqueous wastes from the Site are provided in Appendix E.

A third water sample was collected from the North Containment Area on January 18, 2011, after excavation of impacted soils, removal of potentially impacted base material (caliche) from the floor of the containment area, backfilling of the excavated area, and Site restoration was completed (detailed below under Containment Area Decontamination). Analytical results from that water sample indicated that accumulated water in the North Containment Area after completion of the Removal Action, met discharge criteria (Table 2). Following receipt and evaluation of those analytical results accumulated water in the North Containment Area was released by breaching the containment area wall on January 27, 2011. The South Containment Area wall was breached on January 18, 2011 following decontamination and backfilling of the trenches with imported sandy clay soil as detailed in Section 2.6. Sampling locations and analytical results for the accumulated water samples are discussed in Section 3.0.

## 2.2 ASBESTOS INSPECTION

On November 16, 2010 Phase Engineering, Inc. performed an inspection for potential asbestos containing materials (ACM) within the former AST Tank Farm. Mr. Neal Barnes performed the inspection and collected samples of potential ACM at seven different locations. These samples included debris, gaskets and insulation material. A letter report summarizing the findings of the

asbestos inspection is provided in Appendix D-E. One of the samples collected by Mr. Barnes was found to contain friable asbestos. The asbestos was in a flange gasket located on the east end of Tank No. 10. In order to avoid disturbing this material during tank demolition, EEI used a cutting torch to cut the entire flange containing the gasket out of the end of Tank No. 10 and placed the flange in a metal over-pack drum on December 9, 2010. The over-pack was transported to the EEI yard for temporary storage on January 27, 2011 and ~~is scheduled for disposal~~ was disposed at the Waste Management Coastal Plains Landfill ~~by February 25~~ on March 22, 2011. Copies of EEI's demolition permit with the City of Freeport, the Texas Department of State Health Services Asbestos/Demolition Notification Form completed by EEI for this work, and related correspondence are included in Appendix D-E.

### 2.3 LIQUID WASTES HANDLING AND DISPOSAL

Removal of liquids from the ASTs was started on November 17, 2010 and completed on December 7, 2010. A tanker load of water transported to Clean Harbors on January 6, 2011 contained a mixture of water accumulated during tank decontamination; water recovered from tanks during sludge solidification and mixing; and impacted water from the North Containment area.

Liquids were removed from the ASTs using a pneumatic diaphragm pump, by inserting a suction hose directly in the tank to be drained and pumping into a tanker trailer. To the extent practical, aqueous liquids were separated from non-aqueous liquids (hydrocarbons), in order that hydrocarbons could be used for fuel blending at the disposal facility.

Removal of liquid wastes from the ASTs was performed using a closed discharge system, with the tanker air vent connected to a carbon canister. The "closed" pumping system, along with the carbon canister, was designed to control the release of fugitive emissions during pumping. Air monitoring was conducted using organic vapor monitors (OVM) during pumping activities to ensure criteria established in the Work Plan were not exceeded [sustained (more than 60 seconds) organic vapor measurements were to remain less than 10 part-per-million by volume (ppmv) in the work zone]. In order to minimize the potential for a release of hazardous liquids outside the containment areas, pumps and hoses were kept inside the concrete containment beams as much as possible and plastic liner was placed beneath hoses outside the containment beams. Tanker

trailers were staged inside portable containment to mitigate the potential for a release at hose connections and valves on the tanker.

Approximately 2,300 gallons (21,760 pounds) of non-hazardous aqueous liquids were transported to the Waste Management Coastal Plains facility in Alvin, Texas for disposal. All hazardous liquids, both aqueous and non-aqueous, were transported to the Clean Harbors facility in Deer Park, Texas and disposed of by incineration. Three tanker loads of aqueous liquids were rejected by Clean Harbors due to the presence of viscous hydrocarbons in the load. In each case, these rejected loads were returned to the Site where aqueous liquids were pumped into one of the on-site ASTs for temporary storage, and the viscous hydrocarbons were removed from the tanker and added to sludge in one of the on-site ASTs and solidified.

During the Removal Action approximately 74,500 ~~galleons~~ gallons (~~634,560~~ 612,032 pounds) of aqueous liquids and approximately 14,150 gallons (117,820 pounds) of non-aqueous liquids (hydrocarbons) were transported to Clean Harbors for incineration. All waste liquids were transported from the Site by a licensed waste transporter. Table 3 provides a summary of the quantities and disposition of all liquid wastes removed from the ASTs. Available wastes manifests for liquid wastes transported from the Site are provided in Appendix ~~CD~~.

## 2.4 SOLID WASTES HANDLING AND DISPOSAL

Following the removal of liquids from all of the ASTs, a combination of cutting torches and hydraulic shears were used to open the tanks to allow for solidification of the remaining sludge (and solids). Solidification to the point that there were no free liquids in the wastes was required by the disposal facility, and was accomplished by adding and mixing fly ash to tank contents after liquids were removed. A total of approximately 210,000 pounds (105 tons) of fly ash was required to facilitate solidification. Once sufficiently solidified, sludge was transferred to water-tight hazardous waste containers (roll-off boxes) lined with sealable water-tight liners, using the track hoe bucket, and by hand shoveling the last of the sludge from most of the tanks. Air monitoring was conducted using an OVM during solidification and sludge removal to monitor organic vapor concentrations in order to stay within Work Plan criteria.

Wastes solids were removed from the ASTs, loaded into roll-off boxes and transported off-site for disposal during the period from December 13, 2010 through January 6, 2011. One additional

roll-off box containing a small amount of sludge from the final clean out of Tank No. 6 along with contaminated debris from the demolition of Tank No. 2, was removed from the Site on February 8, 2011. Roll-off boxes loaded with sludge were transported to the Clean Harbors facility in Deer Park, Texas where the sludge (hazardous solids) was incinerated. During the course of the Removal Action, five roll-off boxes of sludge were rejected by Clean Harbors due to the presence of free liquids, and returned to the Site for additional solidification. In each case sorbent material was added to the sludge in the roll-off box and the box was transported back to Clean Harbors. A total of approximately 829,420<sup>364</sup> pounds of hazardous solids were disposed of by incineration at the Clean Harbors facility. A summary of all solid wastes transported from the Site during the Removal Action is provided in Table 4 and copies of available wastes manifests are provided in Appendix ~~CD~~.

## 2.5 AST DECONTAMINATION, DEMOLITION AND DISPOSAL

After all sludge was removed, the tanks were cleaned by scraping, brushing, steam-cleaning, and when necessary spraying and brushing with surfactants to remove any remaining oily residue. Tanks were then cut using a cutting torch or hydraulic shears, and crushed with the track hoe. All tanks were demolished on-site, except Tank No. 14, which was a thick walled tank (greater than 1-inch thick steel). Tank No. 14 had holes cut to render it unusable and was transported off-site in two pieces. All scrap metal from the Removal Action including tanks and tank pieces were transported to Proler Recycling in Houston, Texas and added to their steel recycling. Copies of available bills of lading and CODs for ASTs are provided in Appendix ~~EF~~.

## 2.6 CONTAINMENT AREA DECONTAMINATION

### 2.6.1 South Containment Area

Following the removal of all tanks from the South Containment Area, and in accordance with the Removal Action Work Plan (Appendix ~~D of the Settlement Agreement~~ A), the containment area was cleaned and decontaminated on January 12 and 13, 2011. All debris was removed, sediment on the concrete floor was scraped and removed and the concrete walls and floor of the containment area were pressure washed with a steam cleaner. The removed sediment was sampled and classified as non-hazardous by EEI.

Portions of the north end of the South Containment Area floor contain small trenches (approximately eight inches deep by four to eight inches in width). It appears that the trenches may have originally been present throughout the South Containment Area, but were historically filled with concrete over the middle and south portions of the South Containment Area. The trenches in the north end of the containment area, which were thought to have concrete floors, were filled with sediment and black mud, interpreted as being predominantly derived from the decay of algae and other organic matter. Prior to beginning the decontamination operations, it was determined that the trenches did not have concrete floors, but instead all of the trenches that had not been filled with concrete had clay bottoms.

An air-mover and vacuum box were used to "vacuum" mud and sediment from the trenches to the depths at which clay was encountered, usually around the same level or slightly below the level of the base of the adjacent concrete. The concrete walls of the trenches were then pressure washed. After decontamination of the South Containment Area was complete two verification samples were collected from the clay floor of the trenches as discussed in Section 3.2. Based on a request by EPA, the trenches were subsequently backfilled with sandy clay soil imported from an off-site quarry.

Mud, sediment and water collected in the vacuum box used during decontamination of the South Containment Area were included under the aforementioned non-hazardous characterization for sediment from the floor of the containment area. The vacuum box, including collected mud, sediment and water, was removed from the Site on January 27, 2011 and temporarily stored at an EEI subcontractor's equipment yard in Clute, Texas. It is ~~scheduled for transport to the~~ transported to the Waste Management Coastal Plains Landfill for solidification and disposal as non-hazardous waste on February 24, 2011. Three additional roll-off boxes of non-hazardous debris and sediment scrapings from the South Containment Area, as well as other miscellaneous debris from the Site, were also transported to the Coastal Plains Landfill for disposal as non-hazardous wastes on January 27, 2011. Available manifests for non-hazardous wastes transportation and disposal are provided in Appendix ED.

Pursuant to the Removal Action Work Plan provisions, the South Containment Area berm was breached to preclude future water accumulation. The berm was breached at the two lowest points of the containment area, the northwest corner and the northeast corner, on January 18, 2011 following the completion of all decontamination activities.

### 2.6.2 North Containment Area

During the Removal Action it was discovered that the North Containment Area did not have a concrete floor as originally thought. The floor of the North Containment Area was instead constructed of 4 to 8-inches of caliche-like base material, underlain by clay. The base material in the floor of the containment area was visibly stained with hydrocarbons beneath four of the tanks. Surficial staining was present beneath the two large ASTs (Tanks Nos. 15 and 21). More extensive staining was evident beneath Tank No. 6, which, when removed, was found to have several holes in its base. Staining was also observed below the footprint of Tank No. 2, located adjacent to Tank No. 6; however, the staining is believed to be associated with releases from Tank No. 6.

As a measure to ensure future water accumulated in the North Containment Area would not become impacted by residual contaminants on the caliche floor of the containment area, the North Containment Area floor surface was scraped using a small front-end loader on January 7 and January 14, 2011. The removed surface material scrapings were stockpiled and later loaded into two roll-off boxes, sampled and characterized for disposal (soil scrapings were loaded and sampled on January 14, 2011). Based on the characterization sample results, the North Containment Area floor scrapings were classified as hazardous. The two roll-boxes containing these hazardous soils are ~~currently staged at the Site and are scheduled for shipment to be shipped~~ to the disposal facility during the week of March 4~~21~~, 2011.

Based on the visible staining observed in localized areas of the North Containment Area floor, particularly below the Tank No. 6 footprint, a plan for excavation of visibly impacted soils below the former locations of Tank Nos. 2, 6, 15, and 21 was developed. On January 7, 2011 Eric Pastor of PBW sent an email to Gary Miller of EPA, outlining the proposed approach to address these areas. The planned approach was to excavate visibly impacted soils, sample and characterize excavated soils, and collect confirmation samples from the excavated areas. The approach included a contingency, that in the event that some areas could not be practically excavated to the point that visible staining was removed, or the extent of impacted soil was anticipated to preclude effective remediation by excavation, EPA would be contacted to discuss potential in-place management options. Pending EPA's concurrence, the approach would then be



to excavate as much material as appropriate, and collect verification samples to document volatile organic compound (VOC) and semi-volatile organic compound (SVOC) concentrations in the residual (i.e., post-excavation) soil. The e-mail outlining the approach, supporting documentation, and the EPA's email approving the approach are provided in Appendix FG.

Excavation of the visibly impacted soils in the North Containment Area was performed on January 11, 12, and 13, 2011. Observations made during excavation of the Tank No. 6 area on January 11 and 12, confirmed that the contingency described above would need to be implemented. Visibly impacted soil in this area extended from the surface to approximately 5.5 feet below ground surface at specific locations beneath the former location (footprint) of Tank No. 6. Near the south end of the Tank No. 6 footprint, the impacted soil extended to the west beneath the south end of the former location of Tank No. 2 (approximately south one-fourth of Tank No. 2 footprint), where soil was excavated to approximately 2.5 feet bgs. Beneath the remainder of the Tank No. 2 footprint (north three-fourths of Tank No. 2 footprint) there were no visible impacts at a depth of approximately one foot bgs, and the excavation was terminated at that depth in that area.

During the excavation of the area beneath Tank Nos. 2 and 6, the subsurface material present from the ground surface to approximately 2 to 2.5 feet bgs was observed to consist of fill material (including caliche base material and clay as described above). Outside of the Tank Nos. 2 and 6 footprints, this fill material was not visibly impacted. Except for a thin (approximately 0.2 feet thick) zone of black staining along the contact between the base of the fill and original ground surface (approximately 2 feet bgs), there was no visible staining below 2.5 feet bgs south and west of Tank No. 2.

Approximately the southern two-thirds of the area beneath the Tank No. 6 footprint were excavated to a depth of approximately 5.5 to 6 feet bgs. In the south and east walls of the excavation visibly impacted soils were present from approximately 2.5 feet bgs to approximately 5.5 feet bgs. In this deepest portion of the excavation, a clay soil with no visible impacts was present from approximately 5.5 feet to 6 feet bgs. Beneath the northern end (approximately northern one-third) of the Tank No. 6 footprint, visibly impacted soil was excavated to approximately 2 feet bgs. At that depth visible impacts were limited to localized areas. The extent of the excavation below Tank Nos. 2 and 6 is shown on Figure 4. Verification sampling performed in this area is discussed in Section 3.0, below.

Very well compacted and hard caliche was encountered Beneath the Tank Nos. 15 and 21 footprints. These areas were scraped using a trackhoe to remove surficial staining. Approximately 3 to 4-inches of caliche were scraped from the footprint of both former tanks. Below both the Tank Nos. 15 and 21 footprints, the staining was observed to extend through the caliche base (6 to 8-inches) in localized areas, but did not appear to have visibly impacted the underlying clay. Visibly impacted caliche was removed to the extent practical. Verification sampling was performed beneath both Tanks Nos. 15 and 21 as discussed in Section 3.0.

All excavated soils from the Tank Nos. 2/6 excavation, and the scraped caliche/soil from the Tank Nos. 15 and 21 footprints were placed directly into six water-tight roll-off boxes and sampled for characterization on January 14, 2011. Based on the results of the characterization sampling, this excavated soil was classified as hazardous. Two of the roll-boxes containing excavated soil were removed from the Site for delivery to Clean Harbors for incineration on February 8, 2011. The remaining ~~4~~four roll-off boxes of hazardous soils, along with the two roll-offs containing the surface scrapings from the North Containment Area described above, are ~~currently staged at the Site and are scheduled for shipment~~to be shipped to the disposal facility during the week of March ~~14~~21, 2011. A summary of hazardous soil from the North Containment Area transported from the Site during the Removal Action is provided in Table 5, and copies of available wastes manifests for this material are provided in Appendix ~~C~~D.

After verification samples were collected from the excavated area, the excavation was backfilled with sandy clay soil imported from an off-site quarry and the entire North Containment Area was graded so that accumulated water would drain to the low side (east side of containment area).

Pursuant to the Removal Action Work Plan provisions, and following receipt and evaluation of analytical results from the accumulated water sample collected after completion of the Removal Action and Site restoration in the North Containment Area (sample collected on January 18, 2011), the North Containment Area berm was breached. The berm was breached at the lowest point of the containment area along the east side on January 27, 2011.

### 3.0 SAMPLING AND ANALYSIS

The following sections describe sampling and analysis performed during the Removal Action.

#### 3.1 ACCUMULATED WATER IN CONTAINMENT AREAS

As summarized in Section 2.1 samples of accumulated water were collected from the North and South Containment Areas during the Removal Action on December 30, 2011, and from the North Containment Area only, on January 18, 2011. These water samples were all analyzed for selected VOCs and the results compared to discharge criteria as identified in the TCEQ Surface Discharge Letter (Appendix BC) and listed in Table 2. Field pH measurements collected at the time of sample collection are also included in Table 2.

All accumulated water samples were collected and handled in accordance with the procedures described in the Remedial Investigation/Feasibility Study (RI/FS) Field Sampling Plan (FSP) (PBW, 2006). The samples obtained on December 30, 2010, were collected from the North and South Containment Areas in locations where accumulated water was most likely to be impacted by Site activities performed prior to that date. The South Containment Area water sample was collected near the northwest corner of the containment area where pumps had been staged and pumping activities performed. The North Containment Area was sampled in two locations. Sample "N. Containment (NW)" was collected from water that had accumulated in the footprint of Tank No. 6, and sample "N. Containment (NE)" was collected from water that had accumulated in the footprint of Tank No. 21, both areas where the floor of the containment was observed to be visibly impacted when the tanks were moved. As discussed in Section 2.1 and shown on Table 2, the accumulated water in the South Containment Area met discharge criteria and was discharged to the Intracoastal Waterway. Neither of the two water samples collected from the North Containment Area met discharge criteria. Accumulated water from the North Containment Area was pumped into tanker trailers and transported to the Clean Harbors facility for disposal.

As mentioned above and discussed in Section 2.1, a subsequent accumulated water sample was collected from the North Containment Area on January 18, 2011. This sample was collected following a rainfall event that occurred after the excavated areas in the North Containment Area had been backfilled, and the entire containment area had been scraped and graded. The sample

was collected from water accumulated near the center of the North Containment Area. As previously stated in Section 2.1 analytical results for this sample met discharge criteria, and the accumulated water was released when the containment berm was breached on January 27, 2011.

Table 2 presents a comparison of accumulated water analytical results for both sampling events to discharge criteria. Field pH measurements collected at the time of sample collection or prior to surface water discharge are also provided on Table 2. Laboratory analytical reports and sample validation reports are included in Appendix GH.

### 3.2 SOIL VERIFICATION SAMPLES

In order to document soil conditions at the North Containment Area following completion of excavation activities, eight verification soil samples were collected from this area. These samples were collected after it was determined that impacted soil encountered at depths ranging from approximately 2.5 feet bgs to approximately 5.5 feet bgs could not be practically excavated such that visible staining was removed. The verification samples were intended to characterize VOC and SVOC concentrations in the residual (i.e., post-excavation) soil.

After excavation was terminated in the area beneath Tank Nos. 2 and 6 and the containment area base material floor had been scraped in the Tank Nos. 15 and 21 areas, soil samples were collected from these areas. These samples, which were collected and handled in accordance with FSP procedures, were collected on January 13, 2011. Sample locations, as shown on Figure 4, included:

- one sample from below the Tank No. 15 footprint at a depth of 0.8 feet bgs (T-15-F);
- one sample from below the Tank No. 21 footprint at a depth of 0.5 feet bgs (T-21-F);
- one sample of surface soil near the center of the North Containment Area at a depth of 0 to 0.3 feet bgs (NC-0-0.3);
- one sample from the west wall of the excavation beneath Tank Nos. 2 and 6, west of the former location of Tank No. 2 and near the southwest corner of the overall excavation at a depth of 2.5 feet bgs (T-2-West);

- one sample from the floor of the excavation beneath the footprint of Tank No. 6 approximately 10 feet north of the south end of the former tank location at a depth of 5.8 feet bgs (T-6-Floor);
- one sample from the east wall of the Tank No. 6 excavation approximately 11 feet north of the south end of excavation – this sample was collected in visibly impacted soil at a depth of 4 feet bgs, which is approximately 1.5 feet below the upper limit of visibly impacted soil (T-6-East);
- one sample from the south end of the Tank No. 6 excavation beneath the south end of the former Tank No. 6 footprint – this sample was collected in visibly impacted soil at a depth of 4.5 feet bgs, which is approximately 2 feet below the upper limit of visibly impacted soil (T-6-South); and
- one sample from the north wall of the Tank No. 6 excavation beneath the north end of the former Tank No. 6 footprint at a depth of approximately 2 feet bgs – no visible impacts were observed at this sample location (T-6-North).

Analytical results for the Site's chemicals of interest from the verification samples were evaluated relative to comparison values, which were established by using the lower of the EPA Region 6 Soil Screening Criteria value and the  $TCEQ^{Tot}Soil_{Comb}$  value for an industrial/commercial exposure scenario. The analytical results from the soil verification samples relative to comparison values are summarized in Table 6. Laboratory analytical reports and data validation reports are provided in Appendix GH.

Analytical results for SVOCs did not exceed comparison criteria for any chemicals of interest, at any of the verification sample locations. However, VOC comparison criteria were exceeded at verification sample locations T-15-F (benzene, chloroform and trichloroethene (TCE)); T-21-F (tetrachloroethene (PCE) and TCE); NC-0-0.3 (TCE); T-6-East (benzene, ethylbenzene and isopropylbenzene); T-6-South (benzene, chloroform, and ethylbenzene); and T-6-North (benzene and TCE).

Verification samples were also collected from the clay floor of the trenches in the South Containment Area at two locations. The verification sample locations are shown on Figure 4 and described below:

- one sample of the clay from the floor of the trench near the northwest corner of the containment area - collected approximately 15 feet south of the north berm and 15 feet east of the west berm (SC-W); and
- one sample of the clay from the floor of the trench near the northeast corner of the containment area - collected approximately 15 feet south of the north berm and 19 feet west of the east berm (SC-E).

Analytical results from samples collected in the South Containment trenches (summarized in Table 6) did not exceed comparison criteria for VOCs or SVOCs for any chemicals of interest.

Several exceedences of the comparison criteria listed in Table 6 were noted on an individual sample basis for some of the North Containment Area soil samples. These concentrations resulted in predicted risks that were within EPA's acceptable or target risk range for carcinogens ( $10^{-4}$  to  $10^{-6}$  risk) and below a target hazard quotient of one for non-carcinogens. ~~Consistent with discussions with EPA, the analytical results from all of the verification samples collected in the North and South Containment Areas will be used to prepare based on an addendum to the previously approved Final Baseline Human Health Risk Assessment (BHHRA) for the Site (PBW, 2010) documenting that conclusion industrial/commercial exposure scenario.~~

#### 4.0 CONCLUSIONS

The purpose of the Removal Action at the Gulfco AST Tank farm was to remove and properly dispose of contents of the ASTs; remove, demolish and dispose of the tanks in the AST Tank Farm; and decontaminate the AST Tank Farm containment areas. ~~All~~The overarching Removal Action objectives as set forth in Paragraph 31.f of the Settlement Agreement are to protect the public health, welfare, or the environment. These objectives have been met through performance of the Removal Action activities documented in this report.

## **5.0 REFERENCES**

Pastor, Behling & Wheeler, LLC (PBW), 2006. Sampling and Analysis Plan – Volume I, Field Sampling Plan, Gulfco Marine Maintenance Site, Freeport, Texas. May 16.

Pastor, Behling & Wheeler, LLC (PBW), 2010. Final Baseline Human Health Risk Assessment, Gulfco Marine Maintenance Site, Freeport, Texas. March 31.

United States Environment Protection Agency (EPA), Region 6, 2010. Administrative Settlement Agreement and Order on Consent for Removal Action (Settlement Agreement). October.